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A SURGICAL ACCESS DEVICE

The present invention relates to a surgical device for use in minimally invasive surgery of the type using patient pneumoperitoneum and an access port.

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Minimally invasive surgery of this type is carried out having introduced gas into a patient's body cavity through an incision and sealed the incision with an access port. The access port enables laproscopic and hand or instrument assisted surgery to be performed.

- 10 ~ A sleeve forming such a port is shown in WO-A-95/07056 entitled "Apparatus for use in surgery". The access port sleeve shown is used to create a controlled pressurized environment within the sleeve while allowing a surgeon's arm to pass through the sleeve. During surgery, gas is pumped into the patient's body cavity where the surgery is to be performed and the sleeve prevents gas escaping while allowing the surgeon to operate using minimally invasive surgery techniques. The application shows a sleeve having a flange at a distal end provided with adhesive for adhering the device to a patient's body or alternatively a mounting ring to surround the incision in a patient's body. While providing a suitable apparatus for performing such surgery the device described suffers from the principle disadvantage that in use, the sleeve protrudes upwardly from the patient and may interfere with the activities of the surgery team. Additionally, the sleeve must be sealed against the surgeon's upper forearm by clamping the device to the arm sufficiently tightly to avoid gas leak around the area of the seal. This presents the surgeon with a problem both in sealing the sleeve and in subsequent mobility.
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- 25      A further problem associated with the use of sleeves of the kind described is that a phenomenon known as "tenting" may occur. "Tenting" means that when the sleeve is adhered to the patient's skin or to a surgical drape and gas is induced into the patient's abdominal cavity, there is a tendency for the sleeve to fill with gas and to pull away from the patient.

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There is therefore a need for a surgical device, which will overcome the aforementioned problems.

Accordingly, there is provided a surgical device for use in minimally invasive surgery of the type using an inflated body cavity accessible to a surgeon through an access port, defined by the device, surrounding an incision in a patients body, the device having:-

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body cavity engagement means for insertion into the incision to locate the device in position;

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fixing means for attaching the device to a patients skin;

a sleeve connected between the body cavity engagement means and the fixing means defining an access port; and

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sealing means, operating on the sleeve to prevent substantial leakage of gas from the body cavity on inflation when in an inoperative position and formed to mould a substantial portion of a surgeon's hand or surgical instrument on insertion in an operating position.

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Preferably, the body cavity engagement means is provided by a distal ring formed for insertion into the incision.

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In one arrangement, the distal ring has an associated cuff valve operating on the internal faces of an impermeable film, the film being located between semi rigid actuators, the actuators in turn being secured in substantially parallel manner to a distal ends of the sleeve.

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Preferably the actuators are housed in opposing cuff, each cuff being formed by folding an end of a distal tube to form a pocket for reception of the actuator.

Ideally the actuators incorporate a bio-compatible medical grade foam layer to generate tension between opposing faces of the film and to operate as a cushion between the actuators and objects inserted through the cuff valve.

In an alternative arrangement, the distal ring has an associated self-sealing valve.

Preferably, the fixing means is provided by a proximal ring for engaging with a patient's skin.

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In one arrangement the fixing means incorporates adjustment means for modifying the length of the sleeve. This ensures that the fixing means, distal ring and valves are brought into close contact with the abdominal wall ensuring a good seal is maintained and that the device is firmly mounted in position.

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In one arrangement, the proximal ring has an associated connector ring for receiving additional seals or medical instruments.

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The invention will now be described more particularly with reference to the accompanying drawings, which show, by way of example only, some embodiments of a surgical device in accordance with the invention, in which: -

Fig. 1 is a front view of a surgical device in accordance with the invention;

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Fig. 2 is a section view in the direction of the arrows A-A of the surgical device of Fig. 1;

Fig. 3 is an end view of the surgical device of Figs. 1 and 2;

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Fig. 4 is a side view of an alternative self sealing valve forming part of a surgical device in accordance with the invention in an inoperative position;

Fig. 5 is a side view of portion of the valve shown in Fig. 4 in an operating position;

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Fig. 6 is a side view of a further alternative self sealing valve forming part of a surgical device in accordance with the invention in an inoperative position;